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ABSTRACT

An evaluation system which was used to monitor the progress of resident physicians in the Family Practice Residency at the University of North Carolina is discussed. The system was designed as an information management system which reflects both broad philosophical principles and goals as well as specific behavioral objectives. The three major components of the system are described and illustrated in the appendix: (1) training goals, grouped under three domains (knowledge, skills, and attitudes) and three roles of the family physician (clinician, manager of the practice, and professional); (2) a data collection subsystem in which (a) faculty complete check lists based on reviews of patient charts and encounters with patients, (b) a standardized test is administered, and (c) data are processed by microcomputers; and (3) a subsystem for using the data to assess resident performance and provide educational direction. Educational implications are discussed, as well as implications for program design and management. (GDC)

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COMPONENTS OF A SYSTEM FOR EVALUATING PROGRESS OF PROFESSIONALS IN-TRAINING

by

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PRECIS
COMPONENTS OF A SYSTEM FOR EVALUATING PROGRESS OF PROFESIONALS IN-TRAINING

This paper describes the components of an evaluation system for a professional training program. The key features in its design include an information management system structure and the use of practice principles to focus evaluation data collection on performance of actual practice skills. An example of an evaluation system for monitoring progress of resident physicians in a Family Practice residency is given to illustrate the application of this system. The necessary components described in this evaluation system include a set of training goals, a data collection subsystem, and a subsystem for consistent use of the data in guiding trainees' development and learning. Educational implications are discussed along with implications for program design and management.

COMPONENTS OF A SYSTEM FOR EVALUATING PROGRESS OF PROFESSIONAL IN-TRAINING

Training professionals for careers in medicine, the allied health professions, and law is a demanding task. People training to practice these professions must acquire an extensive knowledge base and complex procedural, communicative and integrative skills. They must also adopt a set of professional attitudes of their own consistent with those established by practicing professionals. Designing educational programs for such a complex set of learning tasks is a real challenge, and nothing is more challenging than establishing effective methods of evaluation for them.

In family medicine residency training, one popular approach has been to incorporate evaluation as part of a "systematic instructional design" approach to curriculum construction. With this approach the knowledge, skills, and attitudes for professional competency are identified and stated as behavioral learning objectives. Evaluation determines whether or not the learning objectives are achieved (Filbeck, 1983). The result of this approach has been a plethora of content and learning objectives listings (FHFA Curriculum Committee, 1983; The Royal NZ College of GP, 1983; CFPC Committee, 1971; Baker & Gordon, 1974). The numbers of objectives in these listings are so numerous that, for evaluation purposes, this approach has created as many problems as it has resolved.

With a vast array of objectives, all objectives cannot be assessed individually. Setting priorities to narrow the scope for evaluation is not easily accomplished. Suppose one chooses to evaluate for minimal competency. In order to do that it must be possible to establish a clear definition of minimal competency behaviors. Though professional skills and knowledge are acquired in an additive fashion, over time, they do not accrue in a very predictable way and are not strictly hierarchical. Also, minimum competency may be situational. The same medical mistake may have no impact or may induce life threatening

complications depending on the context. Under these conditions, defining objectives for minimal competency becomes problematic, since we cannot say absolutely what skills, knowledge or attitudes must exist before more "advanced" levels of performance can be expected.

This paper describes an evaluation approach which may help program designers with the complexities of evaluating professionals in training. It is designed primarily to provide the formative feedback needed by trainees to improve their professional work, though summative evaluation can be included, and alternate analysis procedures can supply program evaluation data. However, summative and program evaluation will not be included in this discussion.

There are two fundamental precepts for the evaluation system outlined here. First, it is basically structured as an information management system. Jelly and Friedman (1980) described the basic components of a systematic approach to resident evaluation which "seeks to integrate all parts of the process of data collection and interpretation into a unified whole." In this approach careful attention is given to how information is <u>used</u> as well as considering the usual methodological issues associated with evaluation research. The basic aspects of the system described by Jelly and Friedman were:

- o multiple sources of data
- o structured periodic occasions for sharing information with trainees
- o outcomes from these occasions in the form of changed behavior, program adjustments for the individual and written reports which became another source of data for future conferences with trainees

The system being discussed in this paper is an expansion of this basic structure.

The second unique characteristic is a set of well defined guiding <u>principles of practice.</u> These principles reflect the fundamental philosophy of the discipline and imply something about the pragmatic practice of the profession. Properly conceived, such principles serve to define a few broad domains under

which more specific behaviorally stated training goals can be subsumed. These goals can then be expressed as a set of behavioral expectations to which trainees' performance can be compared. Like other "domain" concepts in education (Popham, 1975), these provide an organizational structure for item construction and instrument development. Deriving behavioral objectives from practice principles also improves the probability that evaluation data will measure progress toward educational goals with validity.

EVALUATION SYSTEM EXAMPLE

The Family Practice Residency at the University of North Carolina has established an evaluation system designed to incorporate the two key organizational precepts outlined above. The purpose of the system is to provide opportunity for the program designers, administrators and faculty to obtain, interpret and use information about the performance of resident physicians to better guide their development into competent physicians.

The system consists of three major components: 1) a set of training goals, 2) a data collection subsystem, and 3) a subsystem for using the data to assess resident performance and provide educational direction. A conceptual diagram of the system is included in the Appendix. Each of these will be discussed.

TRAINING GOALS

A set of training goals has been defined. They are grouped under three learning domains and according to three possible roles family physicians must fulfill. The learning domains are knowledge, skills and attitudes, standard classifications used in educational design. The three roles are clinician, practice manager and professional. The clinican role includes activities concerned directly with patient care. The practice manager role is concerned with knowledge and skills necessary to set up and manage a small business, like a practice. The professional role is defined by those activities which are required to maintain professional affiliations, remain up-to-date and practice

within legal and ethical standards. Also included in this role are research activities to increase knowledge within the discipline. The training goals are listed in the Appendix.

Special efforts have been made to define explicitly the goals associated with the clinical role. Early in 1984 a task force of faculty and residents in the UNC Department of Family Medicine developed definitions for a set of principles which Shahady (1982) recently described as those most germaine to the practice and teaching of Family Medicine. These six principles are comprehensiveness, continuity, coordination, prevention, community orientation and family orientation in the practice of primary health care. The purpose of this task force was to determine how we might evaluate the teaching of these "Principles of Family Medicine." The Task Force definitions of these Principles developed are listed in the Appendix. The work of the Task Force precipitated the revision of resident performance evaluation, including the statements of training goals, instruments for data collection and our feedback system to residents.

Training goals for the clinician role category were related to the six Principles wherever possible. But probably the most significant accomplishment of the group was the identification of a set of clinical behaviors which faculty felt were indicative that the six Principles were being applied in practice. Instruments were then developed that faculty could use in their teaching to record the presence or absence of these behaviors in residents' patient care.

DATA COLLECTION

Data sources include people who work with residents and can assess their performances fairly, records of patient encounters, and any formal testing or assessment conducted by the program administrators. These sources are enumerated below.

- o Inpatient and Outpatient Care Experiences Except in Family Practice Center

  1) Evaluation forms completed by attendings when residents complete their various service rotations

  2) Documentation of inpatient procedures and diagnoses maintained in computer files for each resident

- o Patient Care in the Family Practice Center

  1) Profiles produced by computer of the number, age, sex and race of patients and the diagnostic entities recorded by each resident in the Family Practice Center (FPC)

  2) Observations of residents' patient care in the Center recorded by faculty preceptors.

- o Standardized Assessments

  Scores from the American Board of Family Practice In-Training Exam, an indicator of the progress residents are making in acquiring the necessary knowledge base.

Instrumentation. Instruments for data collection have been designed to assess the training goals. For example, the resident evaluation instruments from services are designed to assess knowledge of disease processes, clinical skills, and working relationships with peers, staff and patients. Faculty members defined behaviors which are indicators for application of the six Principles and check lists have been designed to record the presence or absence of these behaviors in residents' patient care. Faculty are asked to complete these forms as part of their duties in three regular teaching activities: chart reviews (face-to-face reviews of residents' patient care after each half day of care), active precepting (live TV monitoring of residents' patient encounters), and AV reviews (reviews of video taped patient encounters).

Data Collection and Storage. An essential element in any information management system is the process of data collection and storage. Someone must be responsible for forms distribution and collection. There must be some means for entering data into files and storing it in a manner which facilitates retrieval for examination and/or report. In the system outlined here clerical staff monitor the distribution and retrieval of data collection forms. Non-

respondents are contacted to ensure that information is not lost. Clerical and research support staff enter the data on microcomputer systems for processing. This includes uploading to a main frame, if file size requirements necessitate larger systems for final processing

USING THE DATA

Effective use of data for evaluation of trainees' educational progress depends on two things: 1) the quality of output possible from the data storage sytem and 2) the provision of opportunities to share the information with educational intent. Each trainee has a personal file containing all completed evaluations and computer generated reports of their individual work and training experience. Each trainee is also assigned a team of two faculty advisors who are responsible for monitoring and guiding the residents' professional growth and development during their three years of training.

Reporting. A set of summary reports are now available in the UNC Family Practice Residency evaluation system which can be used to assess residents' progress. These include profiles of individual practices, financial productivity reports, documentation of diagnoses and procedures on other services, summaries of service rotation evaluations, results of the annual ABFP In-Training Exam, and, most recently, a summary of the degree to which Principles of Family Medical care are applied in a resident's own practice. Efforts have been made to structure the reports so that information will be meaningful. Wherever possible, individual information appears with class or program data so comparisons can be drawn. Detailed data are summarized to the most concise level attainable without loss of useful information.

Advisor System. A critical element in the educational application of the evaluation data is a structured resident advisor system. Each resident has two assigned faculty advisors and each pair of advisors works with three residents. The roles and responsibilities of the advisors have been clearly defined in a

set of written guidelines. These are clarified in a dynamic way through periodic meetings of the advisors to discuss the whole advising process and modify it.

Advisors are responsible for using evaluation data to assess their advisees' progress. Periodic conferences (called Educational Prescription Conferences) are held for residents and their faculty advisors to review training progress. The main purpose of the Educational Prescription Conferences is to set educational goals and identify strategies for achieving them. During these conferences residents' training experiences are reviewed and discussed using the data available from the information system. During these discussions the program's training goals are used to identify problems, issues, strengths and weaknesses related to the resident's ability to function as a family physician. Written reports outline what was discussed and an educational prescription consisting of goals and strategies for their achievement. These reports become a part of the resident's permanent file to be referred to at the next conference as a yardstick to measure the resident's progress.

DISCUSSION

Two things have prompted the presentation of the evaluation system described here. First, the basic systematic design has existed in this setting for several years and has proved to be functional. There is a possibility that others might find it to be equally useful in their own settings. Second, there has been an important shift within the program in the way goals and objectives for training are being viewed. Assessment of trainee progress is beginning to focus on specific behaviors. These behaviors have been identified as indicators that key principles of the practice of Family Medicine are evident. This discussion will address each of these points in more detail.

The systems design approach has one elementary feature that will lead to positive outcomes if the approach is adhered to in a disciplined way. Its

application requires an organized plan. There must be an initial definition of the evaluation problem, the resources available to resolve the problem and strategies that are possible to address it. The natural result of this analytic process is a plan for development of the evaluation system. Information gaps are identified and, over time, resources can be systematically brought to bear on the deficits. Eventually, such effort can be expected to improve both the quality and quantity of data which is available. This has certainly been the case in the system described here. Educational Prescription Conferences have always been valuable opportunities for faculty and residents to exchange perspectives about progress and to set training goals. However, there was often the feeling that educational judgments were being made with a very real paucity of information. Recently, there has been a noticeable increase in the amount of information available to faculty conducting these conferences. Faculty comments seem to imply that this has made the quality of the conferences better.

With systems thinking, management of the evaluation system can be facilitated as well. Tasks within the system are readily defined as part of the design of the system itself. Assignment of the tasks can then be made on the basis of the skills and training necessary to get them done. In the system described here clerical and research support staff have been assigned the day-to-day jobs of forms distribution and collection, data entry and filing. This leaves faculty free to use the information for educational guidance and decision making. Microcomputers have also been found to be useful tools for managing data generated in the system and have provided the capability of having current, complete information with minimal personnel increases.

The use of a "principles approach" to the definition of training goals in the program has been exciting for a couple of reasons. First, because definitions of the principles were oriented to the practice of Family Medicine, they lent themselves very readily to a process of defining behaviorally what faculty

should be looking for in residents' patient encounters. From defining observable practice behaviors it was a natural step to design instruments which focus on recording the presence or absence of those behaviors on the part of residents when seeing patients. Validity of the measures which are taken under these circumstances is highly probable. The reliability may be another question. Agreement among a set of independent faculty about existence of a particular behavior may not always be easily reached and the reliability of these evaluation data will need to be established.

Another innovative aspect to what is being done in this approach is that the influence of evaluation on what learners learn is being considered. It is an established phenomenon that learners are strongly influenced to learn what is being used to judge their performances (Frederiksen, 1984). The learners figure out early what <u>really</u> counts and strive for proficiency in these areas. At this program faculty want learners to learn a practice medicine consistent with high standards of primary care and with the philosophical base from which Family Medicine works. By deliberately gathering data which provides information evaluating the degree to which residents apply these concepts in their own practices, the chances are being weighted in the direction of their developing practice habits consistent with these training goals.

The system is not perfect. No system will be or can be and there are areas that still need attention. The need to establish the reliability of the data on practice behaviors has already been mentioned. More information is also needed about residents' practices, particularly regarding procedures done in the FPC, drug prescription patterns, and patterns of office laboratory usage. It would also be instructive to have information about interrelationships which might exist between particular diagnoses and patterns of drug and laboratory usage.

Finally, an area which is neglected here as in most clinical training programs is a structured assessment of residents' clinical skills development. Objective measures can be taken using Objective Structured Clinical Exams or

Oral Examination routines. Oral examinations can also address clinical problem solving abilities though validity of this measure and others trying to assess this skill area are suspect. However, the development and administration of these types of measures is costly in time and personnel resources and it is easy to lower the priority for their development because of that.

The evaluation system described here provides a unique approach for evaluating professionals in training. Its systematic design has practical merit for program development purposes. The relationship between professional practice and the training goals established by defining principles of practice is sound from the standpoint of curriculum and instructional design. The evaluation system in its present form represents an evolutionary product which has developed over time. It seems to have the capacity for continued expansion and refinement to meet the needs of a program as its educational approach evolves and becomes more sophisticated. The final judgment of how well the system works will depend on the extent to which residents and faculty feel it continues to serve their needs in receiving and giving educational direction.

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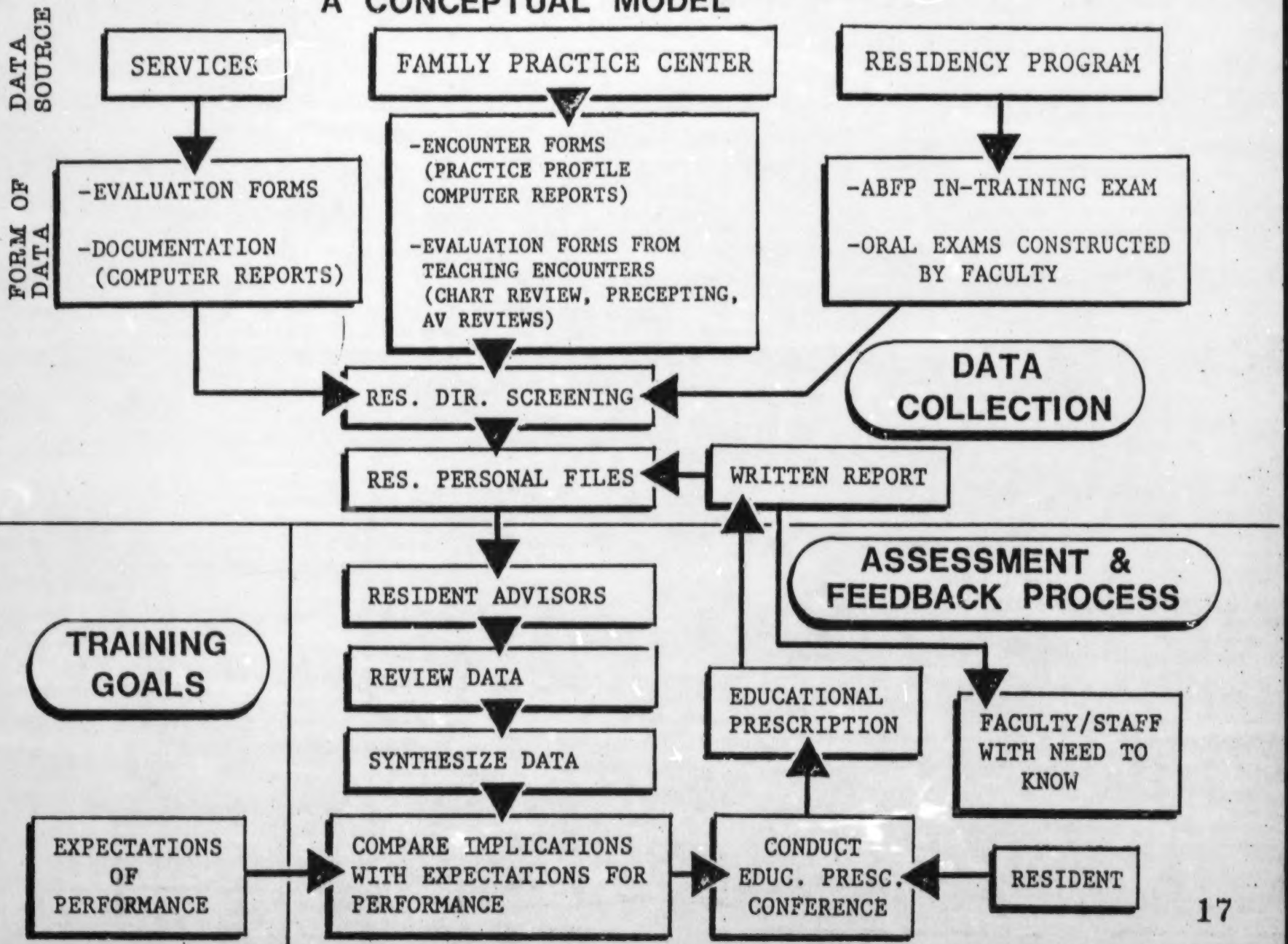
APPENDIX

A. Evaluation System Diagram

B. Definitions of the Principles of Family Medicine

C. Training Goals for Family Medicine

RESIDENT PERFORMANCE EVALUATION SYSTEM: A CONCEPTUAL MODEL



DEFINITIONS: PRINCIPLES OF FAMILY MEDICINE

Comprehensiveness: Family physicians deal with a wide spectrum of diseases and health problems not limited by age or other characteristics of the population served. They are able to engage in responsible decision making in the management of health care for every patient. They have the ability to recognize the physical, social, psychosocial and financial aspects of illness and develop an effective plan.

Family Orientation: Family physicians regard patients as members of a family system, and recognize the effect of the illness on the family, as well as the family on the illness. They have the ability to *work with families* in their adjustment to predictable life cycle crises as well as unexpected events.

Community Orientation: Family physicians understand the influence a patient's community has on his/her health and illness patterns, and is aware of the available health care resources. They can use this knowledge to direct data collection and gain vital information about the potential epidemiology of diseases.

Continuity: Family physicians are committed to providing care to members of a family, or living unit, over time. They are capable of utilizing time for diagnostic and therapeutic purposes, and being committed to contracting with patients for long term health care.

Coordination: Family physicians regard patients as partners in the management of their health problems — they coordinate the administration of therapeutic options in direct care and/or when consultation or referral are used. When necessary, they serve as a patient advocate within the health care system.

Prevention: Family physicians regard the prevention of illness to be as important as its care. They strive to identify health risks within their practices. They attempt to promote behavior which will establish a better state of health, prevent further illness and/or reduce risk factors.

EXPECTATIONS FOR PERFORMANCE
A SET OF TRAINING GOALS FOR FAMILY PRACTICE RESIDENTS AT UNC-CHAPEL HILL

	KNOWLEDGE	SKILLS	ATTITUDES
Clinician Role	1. Possesses sufficient knowledge of disease processes, especially common and chronic diseases and ones which endanger life or have serious complications or consequences. (Comprehensiveness)	1. Collects complete data including physical, psychological and social information with thorough and accurate interviewing and phys. exam techniques. (Comprehensiveness, Family, Community)	1. Adapts methods of communication and information collection to individual patient's social background and capacity to understand and communicate. (Comprehensiveness, Community, Family)
	2. Knows the appropriate therapeutic interventions and regimens to select for treating primary care disease entities and their complications (Comprehensiveness)	2. Synthesizes clinical data to formulate comprehensive differential diagnoses and to select feasible working diagnoses. (Comprehensiveness, Family, Community)	2. Regularly attempts to identify patients "at risk" through consistent screening procedures and employs regular patient education efforts into practice. (Prevention)
	3. Understands how the elements in a person's social system may affect health and illness patterns. (Family, Community, Comprehensiveness, Prevention)	3. Safely conducts diagnostic and therapeutic procedures needed in treatment and management of primary care diseases. (Comprehensiveness)	3. Develops practice habits which facilitate appropriate followup and tracking of patients' care over time. (Continuity)
	4. Knows the community resources available and other health specialists to help manage patients' health problems. (Community, Coordination)	4. Uses empathy properly to establish rapport with patients. (Continuity)	4. Cultivates positive working relationships with partners, peers and members of other health care professions. (Coordination, Community)
	5. Understands the opportunities, methods and limitations of prevention, early diagnosis and health promotion in family practice settings. (Prevention)	5. Makes appropriate treatment decisions for every problem which presents. (Comprehensiveness, Coordination)	5. Regards the patient as a partner in the process of improving and maintaining the individual's health status. (Coordination, Prevention)
	6. Understands dynamics of family and interpersonal relationships and health problems. (Family)	6. Uses time as a diagnostic and therapeutic tool. (Continuity)	
		7. Uses appropriate referral and consultation techniques and procedures. (Coordination)	
		8. Conducts short-term individual and family counseling when appropriate. (Family, Continuity)	

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	KNOWLEDGE	SKILLS	ATTITUDES
Practice Manager	1. Understands the basic principles of sound practice setup and management.	1. Uses time as an organizational tool for planning practice development and in management of patient flow. 2. Manages nursing and office staff in accordance with principles of productive supervision.	1. Conducts practice in a manner consistent with ethical business practices and appropriate concern for fair charges and returns for services.
Other Professional Roles	1. Understands the meaning of "ethical" behavior and its importance to patients and the professions. 2. Understands the basic methods of research. 3. Knows the pertinent medico-social legislation and its impact on both physicians and patients.	1. Evaluates own clinical abilities and knowledge to assess learning needs. 2. Applies the rudiments of statistics to practice data to gain understanding of the epidemiology of the practice.	1. Engages in activities to maintain an up-to-date knowledge base and to facilitate progress in personal growth and development consistent with an attitude which values lifelong learning. 2. Engages in an ethically sound practice of medicine. 3. Exhibits work habits consistent with valuing thoroughness and conscientious attention to accuracy.